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Detection of the spatial clustering mechanisms of streamflow extremes in the USA and relevance to flood insurance data

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During the last decades, scientific research in the field of flood risk management has provided new insights and strong computational tools towards the deeper understanding of the fundamental stochastic behaviour that characterizes such natural hazards. Flood hazards are controlled by hydrometeorological processes and their inherent uncertainties. Historically, a high percentage of flood disasters worldwide are investigated regarding the aggregated number of the affected people, economic losses, and generated flood insurance claims. In this respect, the recently published National Flood Insurance Program data by the Federal Emergency Management Agency may yield novel perspectives into flood impacts. The objective of this study is to conduct a spatial analysis on the daily flow series within the US-CAMELS dataset. Specifically, we seek to identify spatial clustering mechanisms of over-threshold streamflow extremes, considering them as proxies for collective risk, in order to examine their underlying stochastic structure. Furthermore, we explore their relevance to the actual insurance data and develop some additional stochastic modelling approaches.